

Application No. 10/535,360
Technology Center 3754
Amendment dated May 22, 2007
Reply to Office Action dated March 22, 2007

Amendments to the Drawings:

The attached two (2) sheets of drawings include Figures 1-5. These sheets replace the two (2) original drawing sheets, which also included Figures 1-5. Other than being of better quality and revised to correct errors (including the omission of number "1" in Figure 1 and the omission of the letter "i" in Figures 4 and 5), the new drawing sheets do not present any changes to any of Figures 1-5 of the priority document.

Attachment(s): Replacement Sheet(s) (2)

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REMARKS

As of the filing of the present Office Action, claims 1-11 were pending in the above-identified US Patent Application. In the Office Action, the Examiner maintained rejections of all claims under 35 USC §102 and/or §103, and provided thorough explanations of the particular parts of the references relied on to support the rejections.¹ In response, Applicants respectfully request reconsideration for the following reasons.

Drawings

As a preliminary matter, page 2 of the Office Action states that "the

¹ The undersigned respectfully believes that the MPEP does not provide that "further explanation . . . is not required when the reference clearly anticipates subject matter," especially when the subject matter is open to interpretation, as in the present case. On the other hand, the MPEP expressly states the need to "clearly articulate any rejection early in the prosecution process so that the applicant has the opportunity to provide evidence of patentability and otherwise reply completely at the earliest opportunity." MPEP 706. Also see MPEP 706.02(i), cited in Applicants' previous response.

While the Office Action correctly notes that "applicant also received an action in the PCT with regards to these references so applicant should have been aware of the references and their limitations," only the applicability of U.S. Patent No. 6,006,788 to Jung et al. was explained (in the IPER), and even then against claims with different limitations than under review in the USPTO. Therefore, while not wishing to unduly burden the USPTO examining corps (especially in view of the current workload), Applicants respectfully believe their request was reasonable.

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current application does not appear to have a drawings section set forth in the digitally scanned file wrapper,” and noted an error in Figure 1. To remedy this, Applicants are providing with this response drawings that are of better quality and have been revised to correct minor errors (including the omission of number “1” in Figure 1 and the omission of the letter “i” in Figures 4 and 5), but are otherwise substantively identical to those of the priority document.

Prior Art Rejections

Independent claims 1 and 11 and dependent claims 2-10 (which depend from claim 1) were rejected as follows.

Claims 1-3, 5-8, and 11 as anticipated by U.S. Patent No. 4,246,937 to Müller;

Claims 1-11 as anticipated by U.S. Patent No. 6,006,788 to Jung et al. (Jung);

Claims 1-3 and 5-11 as anticipated by U.S. Patent No. 6,631,741 to Katayama et al. (Katayama); and

Claim 4 as unpatentable over Katayama.

For the Examiner’s convenience, claim 1 is reproduced below with reference numbers/letters in parentheses.

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Claim 1: A flexible, tubular metal device with an internal diameter up to 60 millimeters, the device comprising a metal wall in which are formed one or more corrugated convolutions [2] that define a corrugated outside surface [4] and a corrugated inside surface of the device and are oriented perpendicular to a longitudinal axis [8] of the device, each of the convolutions [2] having oppositely-disposed rounded top and bottom portions [T,B,B'], the outside surface [4] of the device having first and second sections [7,9] with change positions [P,P'] therebetween, each of the first sections [7] extending from one of the change positions [P] to another of the change positions [P'] via one of the top portions [T], each of the second sections [9] extending from one of the change positions [P] to another of the change positions [P'] via one of the bottom portions [B], the length of each of the first sections [7] being at least 10% longer than the length of each of the second sections [9], the outside surface [4] having a non-constant curvature derived from a curve that is continuous in the first and second sections [7,9] and defined by the intersection of the outside surface [4] and a plane through a longitudinal axis [8] of the device, the curvature of the outside surface [4] being numerically smaller at the top portions [T] than at the bottom portions [B,B'], the curvature of the curve changing sign only once at each of the change positions [P,P'].

On page 6 of the Office Action, the Examiner explained

the argument that helical convolutions are not perpendicular to the longitudinal axis is not persuasive, where any corrugation is perpendicular to the longitudinal axis, and the suggestion that this limitation is in some way referring to corrugations not helical is not persuasive when such is not claimed in this manner and this argument is more detailed than the claim language.

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Claim 1 requires "one or more corrugated convolutions [2] that . . . are oriented perpendicular to a longitudinal axis [8] of the device, . . ." The ordinary meaning of the term "corrugated" is "parallel ridges and furrows." *Webster's New Twentieth Century Dictionary, Unabridged* (Second Edition). Therefore, "corrugated" convolutions requires convolutions with "parallel ridges and furrows." Applicants use of the term "corrugated" is consistent with its ordinary meaning.

Müller, Jung, and Katayama disclose helical convolutions, consistent with the ordinary meaning of the term "helix" as a "spiral." *Webster's New Twentieth Century Dictionary, Unabridged* (Second Edition). While Müller and Katayama both use the term "corrugated" to describe the cylindrical helixes of their respective tubes/hoses, such use is plainly contrary to the ordinary meaning of the word because the ridges and furrows of a cylindrical helix are defined by a spiral that cannot be parallel to itself. Nor, by definition, can any portion of a cylindrical helix be parallel to the axis of its cylinder - if so, it ceases to be a helix (spiral) and instead defines a simple circular shape.

Therefore, Applicants' claimed "corrugated convolutions" are not anticipated by the helical convolutions disclosed by Müller, Jung, and Katayama.

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Also on page 6 of the Office Action, the Examiner explained

With respect to the argument that the wall 1 of the tube is formed of a metal material that is corrugated and has inner and outer surfaces of the tubular device which is defined as the wall 1, therefore this meets the current claim language where the arguments appear to be more detailed than the claim language. . . . With respect to Katayama, the same is true of the metal layer of Katayama having an inner and outer surface which meet the claim language, where the argument that such excludes further layers being provided on the outside or inside surface is not persuasive and more detailed than the claim language.

Applicants' claim 1 requires "a metal wall in which are formed one or more corrugated convolutions (2) that define a corrugated outside surface (4) and a corrugated inside surface of the device" (emphasis added), and not just its own outside or inside surface. Therefore, "a metal wall" of Applicants' tubular device defines both the outside and inside surface of the device.

Müller, Jung, and Katayama do not disclose tubular devices having both of their outside and inside surfaces defined by a metal wall. The outside surface of Müller's tube is formed of a nonmetallic layer 4, the outside surface of Katayama's hoe is formed of an undisclosed layer "C," and the outside surface of Jung's pipe is formed of a non-convoluted sleeve 7.

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Therefore, Applicants' claimed "metal wall" forming "corrugated convolutions" that are present at both the outside and inside surfaces of a device is not anticipated by the multilayered devices disclosed by Müller, Jung, and Katayama.

Again on page 6 of the Office Action, the Examiner explained

Jung teaches a change from one radius of curvature to another and therefore is a non constant curvature in that inherently the convolutions have a change radius of curvature to go from one to the other and that such is constantly changing, the same as applicants corrugations. . . . For the same reason as described in Jung above, there is a non constant curvature in [Katayama's] corrugations as well.

Applicants' claim 1 requires

the outside surface (4) having a non-constant curvature derived from a curve (6) that is continuous in the first and second sections (7,9) and defined by the intersection of the outside surface (4) and a plane through a longitudinal axis (8) of the device,

Mathematically, a continuous curve is represented by one mathematical expression. The curvature of the outer surface of Jung's tube 1 is not "derived from a curve that is continuous in the first and second sections," but instead is defined by two curves of different curvature ($1/r$ and $1/R$) that share a common

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tangent.

Therefore, Applicants' claimed "non-constant curvature derived from a curve (6) that is continuous in the first and second sections (7,9)" is not anticipated by Jung.

Finally, Applicants' claim 1 also requires

the curvature of the outside surface (4) being numerically smaller at the top portions (T) than at the bottom portions (B,B').

Katayama does not meet this limitation because the curvature (the inverse of the radius) of the outside surface along the lower profile of the tube is unquestionably numerically larger at its top (radial outer) portions ($1/R$) than at its bottom (radial inner) portions ($1/r$), and r is greater than R as evident from the annotated reproduction of Katayama's Figure 1.

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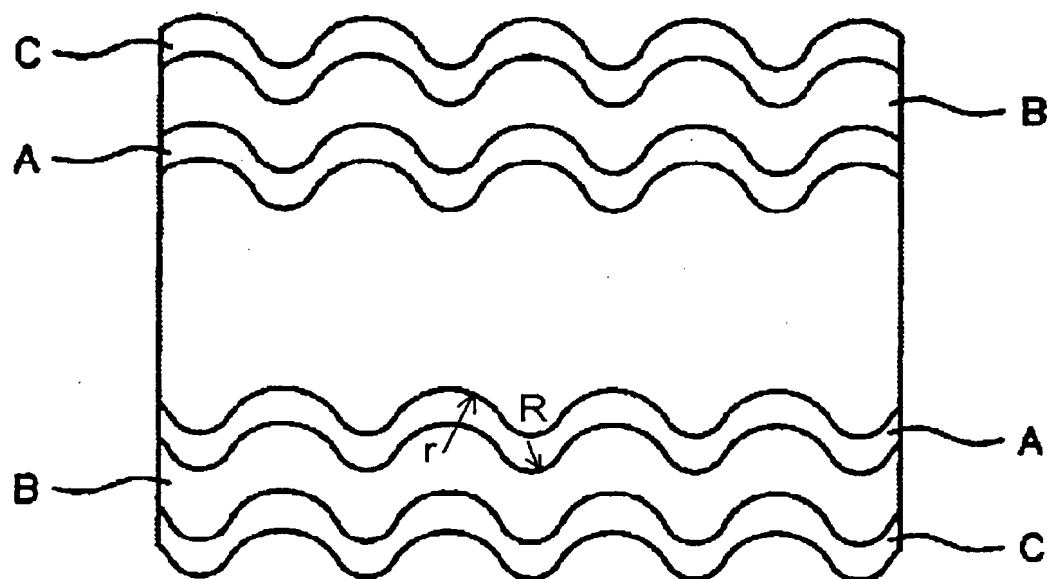


FIG. 1

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For the above reasons, Applicants respectfully believe that the prior art of record does not anticipate Applicants' claimed invention under 35 USC §102.

In view of the above remarks, Applicants believe that one skilled in the art would be required to modify the teachings of the prior art to arrive at Applicants' claimed tubular device. However, any attempt to combine and/or modify these references to resemble Applicants' claimed tubular device cannot be done without altering and possibly degrading the mechanical properties of the prior art tubes and hoses. Therefore, Applicants respectfully believe that the prior art of record also does not obviate Applicants' claimed invention under 35 USC §103.

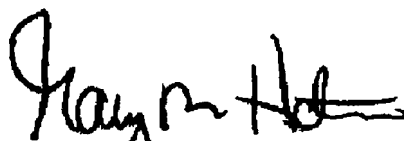
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Closing

Should the Examiner have any questions with respect to any matter now of record, Applicants' representative may be reached at (219) 462-4999.

Respectfully submitted,



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May 22, 2007
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Attachments: Replacement Drawing Sheets (2)